REMARKS

Claims 1 through 29 are pending. As a preliminary matter, Applicant wishes to thank the Examiner for the notice that claims 5 and 27 are allowed and claims 9, 10 and 26 would be allowed if rewritten in independent form. Applicants respectfully traverse and request reconsideration.

Claims Rejections under 35 U.S.C. § 102(b)

Claims 1, 2, 28 and 29 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,241,383 to (Chen).

Chen is directed to a pseudo-constant bit rate video encoder with quantization parameter adjustment (Chen, title). Maintaining a constant bit rate at all times is not sought because of the drastic local bit rate differences resulting from the different compression mode. (Chen, Col. 3 lines 63–67, paragraph 5, lines 24 – 28). Rather, the bit rate transmission is pseudo-constant over each frame time interval. (Chen, Col. 3, lines 67-Col. 4, line 5, Col. 5, lines 28-31, Col. 11, line 68–Col. 12 line 2.) As a result, Chen teaches producing a constant bit rate in every time interval of one frame. In other words, Chen teaches a type of static system in that Chen uses a constant bit rate for the one frame.

In contrast, Applicant's Claim 1, for example, is directed to a type of adaptive sliding window approach for generating a number of bits over a group of frames. For example, Applicant claims, among other things, calculating a first quantizer step size such that a first number of bits are constant over a first given number of frames, starting at a current frame. Therefore, the first quantizer step size remains constant over a first given number of frames. Claim 1 explicitly recites frames in the plural, and therefore, the number of bits generated is constant over more than one frame. Next, the current frame is incremented by an incremental

frame. Finally, the method calculates a second quantizer step size, such that a second number of bits is constant over a second given number of frames, starting at the incremented current frame. (Claims 1, 28). Among other advantages, the sliding window approach generates a constant number of bits over a group of frames starting at the incremented current frame. For example, a full group of pictures (GOP) may be considered for each frame processed, rather than considering only those frames remaining in a static GOP, or waiting until a second static GOP following the first static GOP is processed.

The Office Action on page 6 acknowledges that, rather than increment the current frame, Chen teaches processing the next subgroup of pictures (SGOP). As shown in Fig. 1, and as explicitly required in Chen at Col. 4, lines 47 through 62, the first SGOP contains frames 1 and 2, while the second SGOP contains frames 3 and 4. Incrementing the current frame in the first SGOP (frame 1), results in the next incremental frame (frame 2). However, the first frame in the second SGOP is frame 3 and therefore, frame 3 cannot be the next incremental frame after frame 1, since the next frame after frame 1 would be frame 2. As a result, Chen teaches calculating a first quantizer step size and a second quantizer step size, based on completely separate non-overlapping SGOPs, whereas claims 1 and 28 calculate a first quantizer step size starting at a current frame, and the second quantizer step size starting at the incremented current frame. Therefore, Chen teaches a completely different method of calculating the quantizer step size for rate control by performing a completely different function to provide a completely different result. As a result, Chen fails to teach, among other things, calculating a second quantizer step size, such that the second number of bits is constant over a second given number of frames, starting at the incremented current frame.

With regards to claim 28, Applicants repeat the above remarks regarding claims 1 and 28. According to the Office Action, Chen, at Col. 10, lines 20–30 teaches a single pass. However, Chen, at Col. 10 lines 20–30 instead teaches a quantization matrix used to code SGOP. Chen describes a first pass for determining the best match from the previous nearest intraframe or predicted frame (Col. 6, lines 32-35) a next pass for determining which data should be coded (Col. 6, lines 58-60), and yet another pass for obtaining the best match vectors for a block of pixels to determine which motion compensation is to be utilized (Col. 8, lines 1–3, Chen, Col. 8, lines 50–51). Therefore, as shown in the cited portions of Chen, Chen teaches a multipass method rather than a single pass method. As a result, Chen, as cited, fails to describe each and every element, as arranged in claims 1 and 28. Consequently, Chen, as cited in the Office Action, fails to anticipate claims 1 and 28. Therefore, for at least the reasons stated above, it is submitted that the present rejection is improper and should be withdrawn.

With regards to claims 2 and 29, Applicant respectfully reasserts the arguments made above regarding claims 1 and 28. In addition, Applicant also submits that, because claims 2 and 29 depend from claims 1 and 28 respectively, and are dependent claims therefrom, claims 2 and 29 are allowable for at least the reasons claims 1 and 28 are allowable. Applicants further submit, as argued at least in part immediately above, that the dependent claims are also allowable in light of the presence of novel and nonobvious elements that are not otherwise present in claims 1 and 28.

Claims 1–3, 6–8, 11–19 and 21–24 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,686,963 to (Uz).

Uz is directed to a video encoder for performing rate control. (Uz Col. 1, lines 11–13). Uz describes a group of pictures (GOP) as a set of frames that starts with an I-frame and includes

a certain number of P and B frames. (Uz Col. 1, lines 48–50). Each frame is divided into macroblocks (Uz Col. 1, lines 51–52). A quantization scale factor Q_n is associated with a corresponding macroblock N. (Col. 1, lines 66–Col. 2, line 1). The rate control quantization scale factor Q_n^R for an initial macroblock in the first frame of each type (IPB) in the new scene is a function of total activity (TA_i) (Uz Col. 11, lines 61–63). TA_i for an I frame may be obtained by summing the total activities for all the macroblocks in a frame (Uz Col. 9, lines 8–10). Therefore, both the total activity TA_i, the quantization scale factor Qn, and the rate control quantization scale factor Q_n^R are calculated for each respective macroblock individually and independently from other macroblocks.

In contrast to Uz and as previously stated, the claims are directed to a type of adaptive sliding window approach for generating a number of bits over a group of frames. However, the Office Action on page 7 improperly equates the quantizer step size in the claims with the quantization scale factor Q_n of Uz. (Uz Col. 1, lines 63–66). As a preliminary matter, Uz states that the quantizer step size is determined by the product of a weighting matrix element and the quantization scale factor. Id. As a result, the Office Action mischaracterizes Uz by asserting that the quantization scale factor Q_n is equated to the quantizer step size, despite the explicit teachings of Uz to the contrary. Further, the quantization scale factor Q_n is computed on a macroblock basis independently from other macroblocks, and does not perform the sliding window approach, as described in the claims. For example, the claims require calculating a first quantizer step size, such that a first number of bits are constant over a first number of frames, starting at a current frame, whereas the second quantizer step size is calculated such that the second number of bits are constant over a second given number of frames, starting at the incremented current frame. Further, Uz describes calculating the rate control quantization scale

factor Q_n^R for an entire initial macroblock in the first frame (Uz Col. 11, lines 61–62), and Uz similarly calculates subsequent rate control quantization scale factors, based on initial occupancy (Uz Col. 12, lines 3–8). Further, Applicants note that the Office Action on page 7 fails to even cite to Uz for teaching "starting at the increment current frame." Therefore, Uz fails to teach "calculating a second quantizer step size such that a second number of bits generated at the output of the constant bit-rate finite-buffersize video encoder is constant over a second given number of frames starting at the incremented current frame." As such, the Uz reference, as cited, fails to describe each and every element as arranged in the claims. Consequently, Uz, as cited in the Office Action, fails to anticipate the claims. Reconsideration of the rejection and a showing of all the elements, as arranged in claim 1, is respectfully requested. Therefore, for at least the reasons stated above, it is submitted that the present rejection is improper and should be withdrawn.

Regarding claim 2, Applicants respectfully reassert the arguments made above, especially those with regards to claim 1. In addition, Applicants also submit that these claims depend from claim 1 and other intermediate claims, and provide further patentable subject matter in view thereof. Further, it is submitted that these claims are allowable not merely as being dependent upon an allowable base claim, but rather contain patentable subject matter in view of the prior art of record. Therefore, reconsideration and withdrawal of the present rejections is requested.

With regards to claim 3, the Office Action equates calculating a power value to the total activity (TA) in Uz. Uz, as cited at Col. 11, lines 61-66, describe a bit budget rather than the TA, as asserted in the Office Action. Similarly, the Uz language (at Col. 12, lines 49-55), cited by the Office Action regarding claim 3, relates to a bit budget. Uz, as cited, therefore teaches a bit budget, rather than Applicant's claimed subject matter, including "adjusting a number of bits in a

second frame based on the power value for the first frame." As such, Applicant submits that Uz neither discloses, teaches nor suggests Applicant's claimed subject matter. Consequently, Uz, as cited, fails to anticipate claim 3. Applicants further argue that in part, at least immediately above, the dependent claims are allowable in light of the presence of novel and nonobvious elements contained in the dependent claims that are not otherwise present in claim 3. Therefore, for at least the reasons stated above, it is submitted that the present rejection is improper and should be withdrawn.

With regards to claim 6, Applicants repeat the above relevant remarks regarding Uz, and further incorporate the responses to the previous Office Actions. Applicant submits that the Uz language at Col. 9, lines 23–27, cited by the Office Action regarding claim 6, states that "the displaced frame difference activity (DFDA) is the total activity of the macro block of pixel error values resulting from *subtracting* the motion compensationed prediction of a macro block from the macro block to be encoded." The cited function explicitly performs a mere subtraction. In contrast, claim 6 requires a calculation of a sum of absolute values of the pixel level error values for a pixel block. Since Uz, as cited, describes merely subtracting the motion-compensated prediction of a macroblock from the macroblock to be encoded, Uz teaches a completely different function operating in a completely different way, resulting in a completely different method than the claimed method. As a result, Applicant's subject matter is wholly different than that cited in Uz. Further, since Uz, as cited, fails to describe the calculation of the sum of absolute value of the pixel level error, then Uz necessarily fails to also calculate an expected number of bits for the pixel block based on the sum of the absolute values. The Office Action in the response to argument section on Page 2 cites to Col. 8, lines 51–54. However, this language merely describes summing the absolute differences of *horizontal* pixel pairs and *vertical* pixel

pairs, whereas the claim recites calculating a sum of absolute values of the pixel level error values for a pixel block, and therefore the cited portion of Uz fails to describe at least this claim language. Accordingly, reconsideration of the rejection and a showing of all of the elements, as arranged in claim 6, is respectfully requested. Applicants submit that Uz neither discloses, teaches nor suggests Applicant's claimed subject matters arranged in claims 6, and therefore fails to anticipate claim 6.

With regards to claims 7, 8 and 24, Applicant respectively reasserts the arguments made above regarding claim 6. Applicant submits that claims 7, 8 and 24 are allowable for at least the same reasons discussed above regarding claim 6. Applicant submits that, because claims 7 and 8 depend from claim 6, and as dependent claims therefrom, claims 7 and 8 are allowable for the reasons claim 6 is allowable. Applicant further submits that claims 7and 8 are allowable in light of the presence of novel and nonobvious elements contained in claims 7 and 8 that are not otherwise present in claim 6. As such, Applicant submits that Uz neither discloses, teaches nor suggests Applicant's claimed subject matter.

With regards to claims 11, 12, 13 and 14, Applicants repeat the above-relevant remarks and also the arguments previously made in responses to previous Office Actions. According to the response to the argument section on page 3 of the Office Action, the Office Action asserts that the Applicant states complexity is an example of the normal relationship between a quantization scale factor and a number of encoded bits of a pixel block, based on a known relationship and previous pixel blocks of a same type. However, the Office Action does not cite to any portion of Uz for this teaching. As such, Applicants request a showing. According to the Office Action, Uz further uses the initial value of Q to determine initial occupancies for the corresponding virtual buffers. However, as previously stated, Q merely refers to the quantization

scale factor, whereas the claim recites "predicting a relationship between a quantization scale factor and a number of encoded bits of a pixel block based on a known relationship of previous pixel blocks of a same type." The quantization scale factor Q_n is merely relates to a macro block, and therefore does not provide a relationship in previous pixel blocks of the same type, as required in the claims. Accordingly, reconsideration of the rejection and a showing of all the elements, as arranged in claims 11–14, is respectfully requested. Applicants submit that Uz neither discloses, teaches nor suggests Applicant's claimed subject matter as arranged in claims 11–14, and therefore fails to anticipate claims 11–14.

With regards to claims 15 and 18, Applicants repeat the above-relevant remarks and also the arguments previously made in responses to previous Office Actions. According to the Office Action on page 4, the total activity described in Uz, TA, is the power value and is also equivalent to pixel block complexity. Applicants assert that the total activity, power value and pixel block complexity are separate quantities with different definitions, and are not equivalent as described in Uz. According to the response to the argument section on page 3, Uz at Col. 11, lines 40–49 teaches a calculation of a group of picture level prediction for a number of bits; however, the cited portion of Uz instead teaches an effective frame rate f_{eff}. As such, Uz, as cited, fails to teach "calculating a picture level prediction for a number of bits encoded for a picture." According to the Office Action, Uz calculates a picture level for a number of bits in Col. 12, lines 49–55. As previously stated, the cited portion of Uz merely describes an equation for calculating the bit budget BBi. As a result, the Office Action fails to show where Uz, as cited, teaches among other things "calculating a pixel level prediction for a number of bits encoded for a pixel block." Accordingly, reconsideration of the rejection, and a showing of all the elements as arranged in claim 15, is respectfully requested. Applicants submit that Uz neither discloses,

teaches nor suggests Applicant's claimed subject matters arranged in claim 15, and therefore fails to anticipate claim 16. Regarding claims 16, 17 and 18, Applicants respectfully reassert the arguments made above, especially those with regard to claim 15. In addition, Applicants also submit that these claims depend from claim 15 and other intermediate claims, and provide further patentable subject matter in view thereof. Further, it is submitted that these claims are allowable not merely as being dependent upon an allowable base claim, but rather contain patentable subject matter in view of the subject prioritive record.

With regard to claim 19, the Office Action cites to col. 11, lines 22–32, which describes a deviation from average total activity of TA_i for the frames in a scene, and the calculation of an average motion estimation score for the frames in the scene and a deviation from average. In contrast, claim 19 recites "using the scene change indication to reset a global complexity history; and using the global complexity history to provide the rate control for the video encoder." The cited portion of Uz merely calculates the rate control quantization scale factor Q_n, as a function of total activity, and the bit budget for the frame. The Office Action further fails to even cite to Uz to teach a global complexity history. Uz fails to teach, and further teaches away from, using a global complexity history to provide the rate control for the video encoder, since Uz explicitly teaches calculating the rate control quantization scale factor Q_n as a function of total activity and the bit budget for the frame (Uz Col. 11, lines 61-63). As such, Applicant submits that the present rejection is improper because Uz fails to teach or suggest all the claim limitations as arranged in the claims. Accordingly, reconsideration of the rejection and a showing of all the elements, as arranged in claim 19, is respectfully requested.

With regards to claims 21 and 22, Applicants repeat the above relevant remarks, including the remarks made in response to the previous Office Actions. Applicants repeat the

above relevant remarks, and further assert that the number of bits calculated in order to represent the total activity, as described in Uz, fails to teach a power value, and further teaches away from the calculation of a power value. Therefore, since the Office Action improperly equates completely different parameters namely, the total activity with the power value, the Office Action fails to show how Uz teaches and further teaches away from receiving a power value and providing a target quantizer step size used to provide rate control for the video encoder. As a result, Applicant submits that the present rejection is improper because Uz fails to teach or suggest all the claimed limitations as arranged in the claims. Therefore, for at least the reasons stated above, it is submitted that the present rejection is improper and should be withdrawn. Reconsideration and passage of the present claims to issuance are respectfully requested.

With regards to claims 22 and 23, Applicant repeats the above-relevant remarks, especially those with regard to claim 21. In addition, Applicant also submits that these claims depend from claim 21, and provide further patentable subject matter in view thereof. Further, it is submitted that these claims are allowable, not merely as being dependent upon an allowable base claim, but rather as containing patentable subject matter in view of the prior art of record. Therefore, reconsideration and withdrawal of the present rejections is respectfully requested.

Claims Rejections under 35 U.S.C. § 103(a)

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Uz et al., as applied to claim 3 above, and further in view of U.S. Patent 6,226,326 to (Mihara).

According to the Office Action on page 10, Uz does not teach how to calculate the average. Claim 4 recites wherein the step of calculating the power value for the first frame further comprises the steps of calculating an average value of the pixel values in each of a plurality of pixel blocks within the first frame. Applicants repeat the above relevant remarks,

especially those showing that the total activity parameter defined in Uz TA cannot fairly be equated to calculating a power value for a frame. As previously explained above, Uz further teaches away from calculating a power value, since Uz exclusively teaches calculating the rate control quantization scale factor Q_nR, based on the total activity and the bit budget (Uz Col. 11, lines 61–64). Since Uz teaches away from calculating a power value, one would not be motivated to modify Uz with Mihara to remove the total activity factor and replace it with the power value. Further, one would not be motivated to remove the total activity value from calculating the rate control quantization scale factor and calculating an average value of the pixel value of each of a plurality of pixel blocks within a frame. As such, Applicants submit that the present rejection is improper because the combination of Uz and Mihara fail to teach or suggest all the claim limitations based on the disclosure of Uz and Mihara. Further, since one would not be motivated to modify Uz with Mihara, the Office Action fails to establish a *prima facie* case of obviousness. Further, it is submitted that these claims are allowable, not merely as being dependent upon an allowable base claim, but rather as containing patentable subject matter in view of the prior art of record.

Claims 20 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable, based on Uz et al. in view of U.S. Patent 5,724,100 to (Kuchibhotla). According to the Office Action, Uz does not teach the method of counting a first number of intra-coded pixel blocks in the prediction error image, counting a second number of non-intra-coded pixel blocks in the prediction error image, and calculating a ratio of the first number and the second number, comparing the ratio to a threshold to determine a result, and using the result as a scene change indication. According to the response to the argument section of the Office Action on page 5, Kuchibhotla teaches counting the total intracoded macro blocks and comparing the count to a threshold level.

However, nowhere does the Office Action show where Kuchibhotla teaches calculating a ratio of the first number and the second number, as claimed. In conclusory fashion, the Office Action merely says that the comparison between the number of intracoded blocks and the number of total macro blocks is equivalent to taking the ratio of two intro blocks and comparing the ratio to a threshold. However, according to Kuchibhotla, the comparison is made between the number of intracoded macro blocks and a threshold level number of intracoded macro blocks, and therefore, it is not a comparison between the ratio of intrasto interblocks. As such, the Office Action mischaracterizes Kuchibhotla and contradicts the explicit teachings of Kuchibhotla which, as stated above, teach merely comparing the number of intracoded macro blocks to a threshold level number of intracoded macro blocks. As such, the combination of Uz and Kuchibhotla fails to teach each and every element as arranged in the claims. As a result, Kuchibhotla fails to compensate for the deficiencies of Uz. Therefore, the Office Action fails to establish a *prima facie* case of obviousness. Thus, for at least the reasons stated above, it is submitted that the present rejection is improper and should be withdrawn. Reconsideration and passage of the present claims to issuance respectfully requested.

Accordingly, Applicant respectfully submits that the present claims to issuance are in condition for allowance, and that a timely notice of allowance be issued in this case. The Examiner is invited to contact the below-listed attorney if the Examiner believes that a telephone conference will advance prosecution of this application.

Applicant respectfully requests that the pending claims be allowed to issue. Should the Examiner wish to discuss any aspect of the invention, the Examiner is invited to contact the undersigned at his convenience directly at (312) 609-7970.

Respectfully submitted,

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